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IS 15595 (2005): Industrial Textiles - Bonded Fabrics for Air Filtration [TXD 33: Industrial Fabrics]

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Indian Standard

INDUSTRIAL TEXTILES — BONDED FABRICS FOR AIR FILTRATION — SPECIFICATION

ICS 59.080.30

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 2005 **Price Group 3**

Geo-textiles and Industrial Fabrics Sectional Committee, TX 30

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Geo-textiles and Industrial Fabrics Sectional Committee had been approved by the Textile Division Council.

Bonded filter fabrics are being increasingly used by various industries like cement, aluminium, copper for air filtration and thus their use is expected to minimize air pollution.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INDUSTRIAL TEXTILES — BONDED FABRICS FOR AIR FILTRATION — SPECIFICATION

1 SCOPE

This standard prescribes requirements for scrim supported synthetic needle felts for use in air filtration.

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
667 : 1981	Methods for identification of textile fibres (*first revision*)
1954 : 1990	Determination of length and width of woven fabrics — Methods (*second revision*)
1966 : 1975	Methods for determination of bursting strength and bursting distention of fabrics — Diaphragm method (*first revision*)
6359 : 1971	Method for conditioning of textiles
11056 : 1984	Method for determination of air permeability of fabrics

3 MANUFACTURE

The filter fabric shall be made from fibre or blend of fibres as specified in Table 1.

4 TERMINOLOGY

For the purpose of this standard the following definition shall apply.

4.1 Bonded Fabric — A non-woven fabric consisting of woven fabric scrim sandwiched between two layers (batt) of needle punched non-woven felt held together by needle punching (mechanical bonding).

5 REQUIREMENTS

5.1 Fabric shall conform to the requirements specified in Table 1.

5.2 The length and width of fabric shall be as agreed to between the buyer and the seller subject to following tolerances when determined in accordance with the method prescribed in IS 1954:

Characteristic	*Tolerances*, Percent
Length	+2.0 −1.0
Width	± 1.0

5.2.1 The tolerances shall be subject to a minimum of 1 cm.

6 MARKING

6.1 The fabric shall be marked with the following:

a) Name of material, for example, polyester bonded filter fabric;
b) Variety No. and mass of fabric, in g/m^2;
c) Width and length of piece;
d) Indication of source of manufacture; and
e) Month and year of manufacture.

6.1.1 *BIS Certification Marking*

The fabric may also be marked with the Standard Mark.

6.1.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 PACKING

The fabric shall be packed in bales or cases as per the agreement between the buyer and the seller.

8 SAMPLING AND CRITERIA FOR CONFORMITY

8.1 Lot

The quantity of fabrics of same variety delivered to a buyer against a dispatch note shall constitute a lot.

8.2 The conformity of a lot to the requirements of this specification shall be determined on the basis of the tests carried out on the sample selected from it.

8.3 Unless otherwise agreed to between the buyer and the seller, the number of rolls/pieces to be selected from a lot shall be in accordance with col 2 and 3 of Table 2.

8.4 The number of test samples and the criteria for conformity of a lot for various characteristics shall be as follows:

Characteristics	*Number of Test Samples*	*Criteria for Conformity*
Length, width, thickness	According to col 3 of Table 2	Non-conforming rolls/pieces shall not exceed the corresponding number given in col 4 of Table 2
Mass, tensile strength, bursting strength, air-permeability	According to col 5 of Table 2	All the test samples shall satisfy the relevant requirements

Table 1 Requirements of Bonded Filter Fabric

(*Clauses* 3 *and* 5.1)

Variety (1)	**Fibre** (2)	**Mass** g/m^2 (3)	**Thickness** mm (4)	**Tensile Strength Machine and Cross Direction *Min*** N (5)	**Bursting Strength *Min*** kPa (6)	**Air Permeability** m^3/m^2/min (7)
i)	Polyester	600	2.20	833	3 431	14
ii)	Polyester	550	2.00	784	3 137	16
iii)	Polyester	500	1.80	735	2 941	18
iv)	Polyester	450	1.70	686	2 745	20
v)	Polyester	400	1.65	666	2 450	22
vi)	Acrylic	600	2.25	833	3 431	15
vii)	Acrylic	550	2.10	784	3 137	17
viii)	Acrylic	500	2.00	735	2 941	19
ix)	Polyester/ Acrylic	550	2.00	784	3 431	15
x)	Polyester/ Acrylic	500	1.90	735	3 137	17
xi)	Polypropylene	600	2.30	882	3 921	18
xii)	Polypropylene	550	2.20	833	3 529	20
xiii)	Polypropylene	500	2.00	784	3 431	22
Methods of Test	IS 667	A-4	A-2	A-3	IS 1966	IS 11056
Tolerance, Percent	—	± 5.0	± 5.0	—	—	± 10

Table 2 Sample Size and Criteria for Conformity

(*Clauses* 8.3 *and* 8.4)

Sl No. (1)	Number of Rolls/ Pieces in the Lot (2)	Number of Rolls/ Pieces to be Selected (3)	Permissible Number of Non-conforming Rolls/Pieces (4)	Sub-sample Size (5)
i)	Up to 50	5	0	2
ii)	51 " 150	8	0	2
iii)	151 " 300	13	1	3
iv)	301 " 500	20	1	3
v)	501 and above	32	2	5

ANNEX A

(*Table* 1)

METHODS OF TEST

A-1 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

A-1.1 The tests shall be carried out in standard atmosphere at 27±2°C temperature and 65±2 percent relative humidity (*see* also IS 6359).

A-1.2 Prior to test, the specimens shall be conditioned to moisture equilibrium in the standard atmosphere. Unless otherwise specified, the specimens should be considered to be in moisture equilibrium when successive weighings, at an interval of 2 h, show no progressive change in mass greater that 0.25 percent.

A-2 THICKNESS

A-2.1 Test Specimens

Each of the samples selected according to **8.4** shall constitute test specimens.

A-2.2 Apparatus

A-2.2.1 *Micrometer Gauge* — The gauge shall be provided with the following:

a) Circular presser foot;
b) A dial graduated to read the thickness of the specimen in mm;
c) Means for adjusting the pressure to be applied on the specimen;
d) Means for adjusting the pointer on the dial to zero position; and
e) Means to enable measurements to be made at any distance greater than 15 cm away from the edge of the specimen.

A-2.2.2 The gauge shall meet the following requirements:

a) Presser foot shall have an area approximately 2 500 mm^2, and.
b) Dial shall be capable of being read to an accuracy of at least 0.01 mm.

A-2.3 Procedure

A-2.3.1 Clean the surfaces of the presser foot and the anvil. Adjust the gauge so that it provides a pressure of 2.0 kPa on the specimen during the test. Set the gauge to read zero when the presser foot rests on the anvil.

A-2.3.2 Raise the presser foot and lay a portion of the specimen on the anvil and render it free from wrinkles and creases with no greater tension than is necessary to make it lie flat and straight. Lower the presser feet slowly avoiding jerks or impacts till a pressure of 2.0 kPa is applied on the fabric. Read the dial immediately after the visible movement of the pointer ceases. The time interval before taking the thickness reading shall not be less than 10 s after the pressure is applied.

A-2.3.3 Measure the thickness of the specimen under test at 10 different positions in the manner prescribed in **A-2.3.2**.

A-2.3.4 Report the average of 10 readings as thickness of specimen.

A-3 TENSILE STRENGTH

A-3.1 Preparation of Test Specimen

Cut five test specimens 50 ± 0.5 mm wide and of sufficient length to allow jaw separation of 200 mm from each of the samples selected according to **8.4** in the lengthwise and widthwise directions. Specimens shall be cut so as to cover the entire sample as far as possible.

A-3.2 Tensile Testing Machine

The machine shall be of such capacity that the maximum strength required to break the test specimen shall not exceed 85 percent nor be less than 15 percent of the rated capacity. The rate of traverse of the machine shall be 300 ± 10 mm. The distance between the two grips (gauge length) shall be 200 mm. The machine shall be equipped with a type of grip which tightens automatically and exerts a uniform pressure across the gripping surfaces increasingly as the tension increases so as to prevent uneven slipping and to favour breakage of the specimen in its constricted section. It is advisable to have at the end of each grip, a positioning device so that all the specimens are inserted to the same depth in the jaws and are perpendicular to the direction of the pull. The machine shall be power-driven.

A-3.3 Procedure

Insert a test specimen into the grips of the tensile testing machine taking care to adjust it symmetrically so that the tension will be distributed uniformly over the cross-section (If tension is greater on one side of the test specimen than on the other, reference lines will not remain parallel and the maximum strength will not be developed). Start the machine and note the strength developed on the test specimen when it breaks. Repeat the test with the remaining test specimens.

A-3.4 Calculation

Calculate the average tensile strength of the sample in the machine direction and cross direction separately.

A-4 MASS

A-4.1 Apparatus

A-4.1.1 Apparatus for cutting the test pieces, chosen from among the following:

a) Die which cuts a test piece of an area of at least 10 000 mm^2.

b) Template, with an area of at least 10 000 mm^2 (for example, 100 mm × 100 mm) and a razor blade.

c) Steel rule, accurately graduated in millimetres, and a razor blade.

A-4.1.2 Balance, capable of determining the mass of a test piece to an accuracy of ±0.1 percent of the determined mass.

A-4.2 Preparation and Conditioning of Test Pieces

A-4.2.1 From each sample, cut at least three test pieces, each of an area of at least 50 mm^2, using either the die, or the template and a sharp razor blade. If there is insufficient material to cut test pieces of the specified size, cut the largest rectangle possible and measure its area using the steel rule.

A-4.2.2 Condition the test pieces as specified in **A-1**.

A-4.3 Procedure

A-4.3.1 Determine the mass of each piece in the standard atmosphere for testing.

A-4.4 Expression of Results

A-4.4.1 Calculate the mass per area of each test piece, the mean value in g/m^2.

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Geo-textiles and Industrial Fabrics Sectional Committee, TX 30

Organization	*Representative(s)*
The Bombay Textile Research Association, Mumbai	Dr A. N. Desai ***(Chairman)***
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	Shri J. C. Baveja (*Alternate*)
Bengal Waterproof Ltd, Kolkata	Dr Sujit Dutta
	Shri Raja Garodia (*Alternate*)
Central Road Research Institute, New Delhi	Shri Sudhir Mathur
	Shri Jai Bhagwan (*Alternate*)
Charminar Nonwovens Ltd, Hyderabad	Managing Director
Coir Board, Kochi	Dr U. S. Sarma
	Shri M. Kumaraswamy Pillay (*Alternate*)
Directorate General of Supplies and Disposals, New Delhi	Shri A. K. Sehgal
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Garware Wall Ropes Ltd, Pune	Dr Jimmy Thomas
	Shri S. J. Chitnis (*Alternate*)
Gokak Mills, Belgaum	Shri B. Purushothama
	Shri S. M. Nadgir (*Alternate*)
Gujarat Engineering Research Institute, Vadodara	Chief Engineer and Director
	Research Officer (*Alternate*)
Indian Jute Industries' Research Association, Kolkata	Dr S. K. Chakrabarti
Jaya Shree Textiles, Rishra	Shri A. Nair
	Shri Pawan Sharma (*Alternate*)
Kusumgar Corporates, Mumbai	Representative
Madura Coats Ltd, Madurai	Shri R. M. Sambandam
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	Shri C. K. Jain (*Alternate*)
The Synthetics and Art Silk Mills Research Association, Mumbai	Dr A. K. Rakshit
	Shri K. Guru Datt (*Alternate*)
Urja Products Pvt Ltd, Ahmedabad	Shri Janak Nanawati
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Veermata Jijabai Technological Institute, Mumbai	Dr (Shrimati) S. S. Doke
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Member Secretary
Shri M. S. Verma
Director and Head (TXD), BIS

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